Agronomy "Crib" Notes

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Weed Control and Herbicide Resistant Weeds
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Many Indiana farmers are seeing the benefits of conservation cropping systems that improve soil health (never till + cover crops + nutrient management + integrated weed management). One of the biggest threats to achieving healthy, productive, and resilient soils is herbicide resistant weeds. Weed control is challenging in all cropping systems, and significant time and money are spent on a variety of control programs. With fewer herbicide chemistries available today coupled with less-than-optimal weed and chemistry management in the past, the number of herbicide resistant weeds is increasing.

Development of an overall, long-term strategy is needed to deal with an herbicide resistant weed or poor weed control situation. It is important to understand why and how this extreme situation happened prior to resorting to short-term fixes such as tillage. ***It is time to get back to basics with Weed Control 101!***

Switching to and/or improving a Conservation Cropping System requires numerous seasonal and yearly changes for an operation - - including Integrated Weed Management. To maintain and improve weed control and to prevent herbicide resistant weeds requires a look in the mirror –a review of the past season.

- Is the farmer satisfied with their existing weed control?
- If they are not satisfied, why not?
- Who does the spraying - do they do it themselves or do they hire it out?
- Were last year's weed problems found across the whole farm or limited to specific areas/fields? Patterns?
- If the farmer has herbicide resistant weeds, have they investigated how these weeds got in their fields?
- When and where did they first notice any herbicide resistant weeds?
- And if herbicide resistant weeds are present, what herbicides were used, rates and how often?

NRCS is promoting the use of cover crop mixes which can reduce some herbicide resistant weeds; however, some of these mixes may include species and combinations that are tougher to terminate. If last year's weed control was excellent, then this field may be ready for more advanced cover crop species and combinations. If the farmer had weed outbreaks across most of the farm or has herbicide resistant weeds, then they should use cover crop species that are easier to terminate and that compliment a comprehensive weed control strategy–farmers must have successful "Integrated Weed Management" before seeding complex cover crop species, mixes or strategies.

There are many items included in basic weed control. While these items are not new, they can be forgotten or overlooked. These items include:

- Proper identification of weed species.
- Plant size (smaller plants are easier to kill and take less product to do so).
- Plant growth stage impacts herbicide intake.
- Correct measurement and rate of herbicide.
- Sprayer calibration.
- Proper nozzle selection (droplet size).
- Proper coverage, spray solution volume and pressure.

- Proper mixing order of products to be sprayed.
- Different product formulations.
- Beware of antagonism between products and additives.
- Spray tank water quality (hardness, pH).
- Selection of proper spray additives (AMS, surfactant).
- Beware of environmental conditions (rain, dew, dust, drought, temperature).
- Time of day of application is important for some products.
- Use herbicides with different modes of action and sites of action.
- Use multiple cultural methods of control (mowing, cover crops, crop rotation).
- Enhance the cash crop competition (narrow rows, mulch and/or cover crop canopy).

Record keeping throughout the season is important. Which herbicide(s) was sprayed and where, when and under what conditions? Were there any weed escapes and if so, where and when? Analyzing what worked and what didn't is critical to decide on next year's weed control program.

At the end of season, prior to or during harvest, and again prior to planting is a good time to examine fields for problem weeds that have emerged and/or escaped the past season's weed management. This end-of-season diagnosis is also important preparation for next year. Also, do not forget to scout f**ilter strips, grassed waterways, fence rows, and other non-farmed areas, including road sides**, as these can harbor invasive and noxious weeds.

For improved weed control and especially to reduce the potential of herbicide resistant weeds, it is very important not to use herbicides with the same site of action. Be sure to use herbicides with different mode-of-action. For more details see: Corn & Soybean Herbicide Chart – Mode of Action.

Be sure to follow all label instructions and check for plant back restrictions for both the subsequent cash crops and cover crops.

Proper identification and treatment of problematic weeds along with Integrated Weed Management strategies can reduce the weed seed bank in the soil and the potential development of herbicide resistant weeds. Integrated Weed Management is important to maintain the gains that have been made in conservation agriculture and to improve conservation cropping systems that improve soil health.

Reminders & Additional Resources

Herbicide-Resistant Weeds Threaten Soil Conservation Gains: Finding a Balance for Soil and Farm Sustainability
CAST Issue Paper #49, February 2012
2014 Weed Control Guide for Ohio and Indiana - Bulletin 789, Pub #WS16, 2014
Corn & Soybean Herbicide Chart – Mode of Action - Purdue Extension, GWC-3, January 2013.
Facts about Glyphosate-Resistant Weeds - Purdue Extension, GWC-1, December 2006
Understanding Glyphosate to Increase Performance - Purdue Extension, GWC-2, December 2006
The Impact of Water Quality on Pesticide Performance - Purdue Pesticide Programs, PPP-086, November 2009
Rapid Spread of Resistant Weeds - Ag Professional 9/13/2013
Herbicide Resistance website, Weed Science Society of America

Prior issues of this publication are located at http://www.in.nrcs.usda.gov/technical/agronomy/agronomy.html